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Date: June 29, 2005

To: Examiner Margaret Einsmann **Art Unit:** 1751
USPTO

Facsimile: 703-872-9306 **Telephone:**

From: Streets & Steele
Debi Labay

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CERTIFICATE OF TRANSMISSION
37 C.F.R. 1.8

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6/29/05 Debi Labay
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Attached please find the following document for the above referenced patent application:

1) **Second Appeal Brief [24 pages].**

Patent
Attorney Dkt. No.LYNN/0151

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Appellant:	Don Elrod	§	Confirmation No: 3470
Serial No.:	10/084,829	§	Examiner: Margaret Einsmann
Filed:	February 28, 2002	§	Group Art Unit: 1751
For:	Antimicrobial Fabrics Through Surface Modification	§	By Facsimile: 703-872-9306

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SECOND APPEAL BRIEF

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Attorney Dkt. No.LYNN/0151

APPEAL BRIEF

Appellant timely filed a Notice of Appeal to this Board on May 3, 2005 appealing the decision of the Examiner in the Final Office Action dated November 3, 2004 for the above captioned application. Appellant then submitted its first Appeal Brief pursuant to 37 C.F.R. 41.37 on May 18, 2005. The Examiner filed a Notice of Non-Compliant Appeal Brief for not stating the correct status of the claims. Applicant hereby files its Second Appeal Brief, which is amended only under Section (3) STATUS OF THE CLAIMS and Section (4) STATUS OF AMENDMENTS.

(1) REAL PARTY IN INTEREST

The real party of interest in this action is Lynntech, Inc., the recorded assignee of the entire right, title and interest in and to the patent application now under appeal before this Board. Lynntech, Inc. is a corporation of the State of Texas, having a place of business at College Station, Texas.

(2) RELATED APPEALS AND INTERFERENCES

There are no other appeals or interferences known to Appellant, Appellant's legal representative, or Assignee that will affect or be directly affected by or have a bearing upon the Board's decision in the pending appeal.

(3) STATUS OF THE CLAIMS

The status of all claims in the application under appeal is as follows: claims 7-19, 21-26, 28-30 and 34-53 are pending in the application and all stand rejected. Claims 1-6, 20 and 31-33 are withdrawn. Claim 27 is cancelled. All of the rejected claims 7-19, 21-26, 28-30 and 34-53 are under appeal. There are two claims numbered 49, which were entered with duplicate

numbers. This Second Appeal Brief is filed to correctly note the classification of the claims that now stand withdrawn.

(4) STATUS OF AMENDMENTS

On March 9, 2005 Appellant filed a Response to the Final Office Action from which this appeal was taken. The Examiner issued a Notice of Non-Compliant Amendment and did not enter the requested amendment to cancel the withdrawn claims made in the Response to the Final Office Action. No amendments are outstanding.

(5) SUMMARY OF CLAIMED SUBJECT MATTER

Appellant claims a fabric that is useful as an antimicrobial fabric and as a protective fabric against chemicals. (Claims 23 and 34). The claimed fabric is a fabric that is treated with any method of graft polymerization that creates a free radical species on the surface of the fabric, such as the use of ozone to form peroxide groups on the fabric, subsequently decomposing the peroxide groups with an iron catalyst to form oxygen radicals and then grafting a polymerizable monomer to the oxygen radicals on the fabric surface. (Specification, p. 3, last paragraph). In a preferred embodiment, the monomer is a carboxylic acid. *Id.*

The monomer that is grafted to the fabric has either a functional group that has antimicrobial activity or a functional group that can be converted to a form that has antimicrobial activity. (Specification, p. 4, last paragraph). Examples of monomers other than carboxylic acid that may be grafted to the fabric include quaternary ammonium salts, quaternary phosphonium salts, peracids, biguanides and iodophors. (Specification, p. 5, paragraph 3).

When the monomer is a carboxylic acid, the carboxyl functional group can then be reacted with a mineral acid and hydrogen peroxide to form a peracid functionality on the surface

of the fabric. (Specification, p. 5, last paragraph). Because the peracid functionality is a nonspecific oxidizer, microorganisms are eradicated without the likelihood of significant resistance developing and chemical agents are decontaminated on contact with the modified fabric surface. *Id.* The decomposition product of the modified textile is oxygen, with the grafted monomer returning to its carboxylic form. (Specification, p. 6, first paragraph).

Importantly, after exhaustion of the fabric's antimicrobial/detoxifying properties and the return of the fabric to its carboxylic form, regeneration can be accomplished by treating the fabric with mineral acid and hydrogen peroxide. (Specification, page 6, paragraph 3).

(6) GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

a. Claims 17-19, 21-26, 28-30, 34-53 stand rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over U.S. Patent No. 4,810,567 issued to Calcaterra, *et al.*

b. Claims 35-53 stand rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement.

(7) ARGUMENT

a. Claims 17-19, 21-26, 28-30, 34-53 stand rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over U.S. Patent No. 4,810,567 issued to Calcaterra, *et al.*

(1) Review of the cited prior art. Calcaterra discloses a broad class of antimicrobial fabrics that result from graft copolymerization of a functionalized vinyl monomer onto a base fabric followed by reaction of the functional group of the graft copolymer, or some derivative thereof, with another functional group of an antimicrobial reagent with formation of a covalent

bond. (Calcaterra, Abstract). Calcaterra discloses a fabric having a copolymer bound thereto, wherein the copolymer has an functional group X selected from carboxyl, amino, epoxy, halogen, isocyanate, carbonyl, nitrile, or hydroxyl moiety. (Calcaterra, col. 8, lines 55-68). This functional group is then reacted with another functional group Y that is part of an antimicrobial agent to form Z. (Calcaterra, col. 9, lines 51). Z includes such groups as amides, esters, urea, urethane, ether, amine, and imine groups. *Id.* The antimicrobial "□" is attached to the Z functional group. (Calcaterra, col. 9, lines 25-60).

The copolymer is formed by generating radicals that add to the vinylic monomer, with subsequent chain propagation of the new radical via its addition to other molecules of vinyl monomer. (Calcaterra, col. 8, lines 25-32). The copolymer chain may then be terminated and the result is a copolymer of the vinylic compound grafted onto the fabric. (col. 8, lines 30-33).

The polymeric chain may be terminated by any one of a variety of usual chain terminating processes one of which includes additional of oxygen to form a peroxy radical, which then abstracts a hydrogen to form a hydroperoxy termination group T, -OOH. (Calcaterra, col. 8, lines 36-65). The molecular weight of a typical copolymer that is bound to the fabric is about 2000. (Calcaterra, col. 13, lines 18-30).

(2) Applicable law. As the MPEP § 2131 provides:

> A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described in a single prior art reference." *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631 (Fed. Cir. 1987). "The identical invention must be shown in as complete detail as is contained in the . . . claim." *Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 1236 (Fed. Cir. 1989). The elements must be arranged as required by the claim, but this is not an *ipsissimis verbis* test, *i.e.*, identity of terminology is not required. *In re Bond*, 910 F.2d 831 (Fed. Cir. 1990).

Id.

Furthermore, a claimed invention is unpatentable if the differences between it and the prior art "are such that the subject matter *as a whole* would have been obvious at the time the invention was made to a person having ordinary skill in the art." 35 U.S.C. 103(a) [emphasis added]. As the Federal Circuit has stated, "Focusing on the obviousness of substitutions and differences instead of on the invention *as a whole* . . . was a legally improper way to simplify the difficult determination of obviousness." *Hybritech Inc. v. Monoclonal Antibodies, Inc.*, 802 F.2d 1367, 1383 (Fed. Cir. 1986) [emphasis added].

To establish a *prima facie* case of obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, 985 (CCPA 1974). All words in a claim must be considered in judging the patentability of that claim against the prior art. *In re Wilson*, 424 F.2d 1382, 1385 (CCPA 1970).

The Federal Circuit has made clear that all claim limitations must be considered and that it is impermissible to merely consider the "idea" of an invention. In *Jones v. Hardy*, 727 F.2d 1524 (Fed. Cir. 1984), the Federal Circuit stated:

Additionally, a *prima facie* case of obviousness requires that the Examiner provides a basis for combining or modifying the cited references. The mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination. *In re Mills*, 916 F.2d 680 (Fed. Cir. 1990).

In the case *In re Rouffet*, 149 F.3d 1350 (Fed. Cir. 1998), the Court states:

> When a rejection depends on a combination of prior art references, there must be some teaching, suggestion, or motivation to combine the references. Although the suggestion to combine references may flow from the nature of the problem, the suggestion more

> often comes from the teachings of the pertinent references or from the ordinary knowledge of those skilled in the art that certain references are of special importance in a particular field. Therefore, when determining the patentability of a claimed invention which combines two known elements, the question is whether there is something in the prior art as a whole to suggest the desirability, and thus the obviousness, of making the combination.

Id. at 1356 [citations omitted].

In the case *In re Lee*, 277 F.3d 1338 (Fed. Cir. 2002), the Federal Circuit held:

> When patentability turns on the question of obviousness, the search for and analysis of the prior art includes *evidence* relevant to the finding of whether there is a teaching, motivation, or suggestion to select and combine the references relied on as evidence of obviousness.

Id. at 1343, emphasis added.

The courts have recognized that most inventions are made up of elements that have already been discovered and utilized. It is the specific combination of these elements, however, that define the invention being claimed. For example, in the case *In re Kotzab*, 217 F.3d 1365 (Fed. Cir. 2000), the Court states:

> Most, if not all inventions arise from a combination of old elements . . . Thus, every element of a claimed invention may often be found in the prior art. However, identification in the prior art of each individual part claimed is insufficient to defeat patentability of the whole claimed invention. Rather, to establish obviousness based on a combination of the elements disclosed in the prior art, there must be some motivation, suggestion or teaching of the desirability of making the specific combination that was made by the applicant.

Id. at 1395.

The case law makes clear that the best defense against the subtle but powerful attraction of a hindsight-based obviousness analysis is rigorous application of the requirement for a

showing of the teaching, suggestion, or motivation to combine prior art references. *See, e.g., C.R. Bard, Inc. v. M3 Sys., Inc.*, 157 F.3d 1340, 1352, 48 USPQ2d 1225, 1232 (Fed. Cir. 1998) (describing "teaching or suggestion or motivation [to combine]" as an "essential evidentiary component of an obviousness holding"); *In re Rouffet*, 149 F.3d 1350, 1359, 47 USPQ2d 1225, 1232 (Fed. Cir. 1998) ("the Board must identify specifically....the reasons one of ordinary skill in the art would have been motivated to select the references and combine them"); and *In re Fritch*, 972 F.2d 1260, 1265, 23 USPQ2d 1780, 1783 (Fed. Cir. 1992) (examiner can satisfy burden of obviousness in light of combination "only by showing some objective teaching [leading to the combination]").

Further considering the impermissible use of hindsight obviousness analysis in the case *In re McLaughlin*, 443 F.2d 1392 (CCPA 1971), the Court stated:

> It should be too well settled now to require citation or discussion that the test for combining references is not what the individual references themselves suggest but rather what the combination of disclosures taken as a whole would suggest to one of ordinary skill in the art. Any judgment of obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning, but so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made *and does not include knowledge gleaned only from applicant's disclosure*, such a reconstruction is proper.

Id. at 1395, emphasis added.

(3) Each and every element as set forth in Appellant's claim is not found, either expressly or inherently described in the cited prior art reference. Appellant claims an antimicrobial fabric that is produced in accordance with a method that includes, *inter alia*, grafting a polymerizable monomer to oxygen radicals formed on the surface of the fabric, wherein the grafted fabric comprises a disinfectant that is the polymerizable monomer or a

derivative of the polymerizable monomer. (Claim 23). Appellant further claims a fabric that has undergone the steps of grafting a carboxylic acid to the oxygen radicals and oxidizing the carboxylic acid to a regenerable percarboxylic acid. (Claims 34 and 7). Appellant further claims that the grafted fabric comprises sufficient peracid to detoxify pesticides. (Claims 21 and 38).

The Examiner states that the fabric of Calcaterra has the same properties as the fabric claimed by Applicant. (Final Office Action, p. 5). However, Applicant respectfully asserts that it is not only the properties of the fabric that are being claimed by Appellant but the structure of the fabric itself based upon the method of making the fabric. Appellant claims a fabric having a *monomer* grafted to the fabric. Calcaterra discloses a fabric having a *copolymer* grafted to the fabric. Since a copolymer is not the same as a monomer, Calcaterra fails to disclose each and every limitation claimed by Appellant in independent claims 23 and 34. Furthermore, Calcaterra does not disclose a fabric having sufficient peracid to detoxify pesticides as claimed by Appellant in claims 21 and 38. Calcaterra is silent as to whether the fabric disclosed therein is useful for detoxifying pesticides.

Because Calcaterra does not disclose each and every element as set forth in Appellant's claims, Appellant respectfully asserts that a *prima facie* case of anticipation has not been presented. Appellant therefore respectfully requests the Board to find the claims presented upon appeal to be patentable.

(4) All the limitations claimed by Appellant are not taught or suggested by the cited prior art. Calcaterra does not teach or suggest each of the limitations claimed by Appellant. As noted above, Appellant claims grafting a monomer to the oxygen radicals on the fabric surface, wherein the disinfectant is the polymerizable monomer or a derivative thereof. (Claim 23).

Appellant further claims grafting a carboxylic acid to the oxygen radicals on the fabric surface and oxidizing the carboxylic acid to a regenerable percarboxylic acid to provide protection against chemicals. (Claims 34, 7). Appellant also claims a fabric comprising sufficient grafted percarboxylic acid to detoxify pesticides (Claim 38, 21) and to detoxify chemical and biological weapons (Claims 39, 22).

The Examiner points to the teaching of Calcaterra that the copolymer chain attached to the fabric of Calcaterra may be terminated with an oxygen to form an –OOH as a chain terminator. (Final Office Action, p. 5). Appellant respectfully asserts that (1) Calcaterra does not teach or suggest that the chain terminator provides an antimicrobial effectiveness on the fabric; (2) the small amount of –OOH used as a chain terminator of the copolymer attached to the fabric of Calcaterra is not sufficient to provide effective biocidal activity or effective chemical weapon or pesticide detoxification. As Calcaterra teaches and discloses, the active component of the fabric is the antimicrobial agent bonded to the functional group of the monomers that are reacted to form the copolymer bonded to the fabric. There are many of these functional groups within the copolymer that is bonded to the surface of the fabric, but only one chain terminator per chain. Therefore, the chain terminator of Calcaterra does not provide a beneficial amount of activity on the fabric. Therefore, since Calcaterra does not teach or suggest each and every limitation claimed by Appellant, a prima facie case of obviousness has not been presented. Appellant respectfully requests that the Board find the claims presented on appeal to be patentable.

(5) The Examiner has presented no evidence of a teaching, suggestion or motivation to modify the cited prior art references. Appellant respectfully asserts that the Examiner has

failed to provide a *prima facie* case of obviousness for failure to show that the fabric of the prior art is essentially identical to the fabric claimed by Appellant The Examiner states that the subject matter would have been obvious to the skilled artisan because the patentability of a product by process claim does not depend on the method of production and where the examiner has found a similar product, the burden rests with the applicant to prove the product is patentably distinct (Final Office Action, p. 3).

The Examiner, however, has not addressed the differences in the fabric. As stated in the sections above, Appellant claims a *monomer* bound to the fabric and Calcaterra discloses a *copolymer* bound to the fabric. Appellant claims sufficient percarboxylic acid grafted to the fabric to be effective for detoxifying pesticides and chemical and biological weapons. Calcaterra is silent on this subject and merely states that the copolymer chain may be terminated by a –OOH, but the concentration of the –OOH would not be sufficient to detoxify pesticides and chemical and biological weapons. Calcaterra discloses a typical molecular weight of the copolymer bonded to the fabric as being about 2000. Since the –OOH terminal group has a molecular weight of 33, only a little more than 1 % of the bonded copolymer would be at all active for detoxifying chemical or biological weapons, which the fabric of Calcaterra would be unable to do.

Therefore, since the fabric of the cited prior art reference is not similar to the fabric claimed by Appellant, Appellant respectfully asserts that a prima facie case of obviousness has not been presented. Appellant respectfully request the Board to find that the claims presented on appeal are patentable.

b. Claims 35-53 stand rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. Specifically, the Examiner has asserted that the claims contain subject matter not described in the specification in such as a way as to reasonably convey to one skilled in the relevant art that the inventor, at the time the application was filed, had possession of the claimed invention.

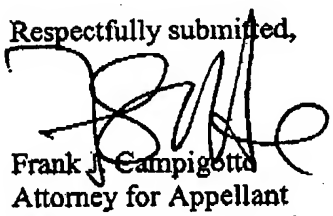
Applicant respectfully asserts that the specification includes adequate description of the subject matter. First, original claims 21 and 22 both claim that a sufficient amount of polymerizable monomer is grafted onto the fabric to detoxify pesticides and to detoxify chemical and biological weapons.

Furthermore, the specification discloses that "because the peracid group is a nonspecific oxidizer, microorganisms are eradicated without the likelihood of significant resistance developing and chemical agents are decontaminated on contact with the modified fabric surface." (Specification, p. 5, lines 27-29). Furthermore, the specification discloses that "in addition, these surface-modified fabrics could be used in chemical-protective clothing for agricultural workers to reduce skin exposure to pesticides as well as protecting military personnel from biological and chemical weapons." (Specification, p. 6, lines 8-11). "The peracid functional groups are permanently immobilized to the fabric providing potent microbiological and chemical protection." (Specification, p. 6, lines 14-15). "Importantly, after exhaustion of the fabric's antimicrobial/detoxifying properties, regeneration can be accomplished by treating the fabric with mineral acid and hydrogen peroxide. (Specification, p. 6, lines 22-23). Such fabric has wide variety of uses and can serve many sectors including medicine, agriculture, military and consumer products. (Specification, p. 6, lines 25-27).

Because the specification adequately discloses the claimed subject matter, Appellant respectfully requests the Board to find that the claims presented on appeal are patentable.

WHEREFORE, Appellant respectfully request that this Board find that claims 22-40 and 52-70 presented on appeal are patentable.

Respectfully submitted,



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Appellant:	Don Elrod	§	Confirmation No: 3470
Serial No.:	10/084,829	§	Examiner: Margaret Einsmann
Filed:	February 28, 2002	§	Group Art Unit: 3470
For:	Antimicrobial Fabrics Through Surface Modification	§	

APPENDIX IN SUPPORT OF APPELLANT'S APPEAL BRIEF

APPENDIX A

THE CLAIMS

What is claimed is:

1. (Withdrawn) A method of making antimicrobial fabrics comprising the steps of:

creating a free radical species on a surface of the fabric; and

reacting a polymerizable monomer with the free radical species to initiate graft polymerization of the monomer on the fabric surface, wherein the monomer has a functional group selected from antimicrobial groups, precursors to antimicrobial groups, and combinations thereof.

2. (Withdrawn) The method of claim 1, wherein the free radical species on the fabric surface is created by means of gamma irradiation polymerization techniques.

3. (Withdrawn) The method of claim 1, wherein the free radical species on the fabric surface is created by means of UV-assisted polymerization techniques.

4. (Withdrawn) The method of claim 1, wherein the free radical species on the fabric surface is created by means of flame-initiated polymerization techniques.

5. (Withdrawn) The method of claim 1, wherein the free radical species on the fabric surface is created by means of plasma-induced polymerization techniques.

6. (Withdrawn) A method of making antimicrobial fabrics comprising the steps of:

treating a fabric with ozone to form peroxide groups on the fabric;

decomposing the peroxide groups with an iron catalyst to form oxygen radicals; and grafting a polymerizable monomer to the oxygen radicals on the fabric surface.

7. (previously presented) The fabric of claim 23, wherein the monomer is a carboxylic acid.

8. (previously presented) The fabric of claim 7, wherein the disinfectant is a peracid that is the derivative of the carboxylic acid, the method for producing the fabric further comprises:

reacting the carboxylic_acid with a mineral acid and hydrogen peroxide to form the peracid on the fabric surface.

9. (previously presented) The fabric of claim 7, wherein the monomer is acrylic acid.

10. (previously presented) The fabric of claim 23, wherein the monomer is selected from the group consisting of quaternary ammonium salts, quaternary phosphonium salts, peracids, biguanides, iodophors, n-halamines and combinations thereof.

11. (previously presented) The fabric of claim 8, wherein the peracid grafted to the fabric is regenerable, the method further comprises:

regenerating the peracid by exposing the fabric to mineral acid and hydrogen peroxide.

12. (previously presented) The fabric of claim 23, wherein the fabric is selected from the group consisting of cotton, linen, gauze, polyester, nylon, acrylic and blends thereof.

13. (previously presented) The fabric of claim 23, wherein the monomer has a nonpolymerizable functional group selected from carboxyl, amino, hydroxyl, sulfhydryl, amido, and mixtures thereof.

14. (previously presented) The fabric of claim 23, wherein the method of producing the fabric further comprises:

providing a polymerizable co-monomer along with the monomer to form a copolymer.

15. (previously presented) The fabric of claim 14, wherein the copolymers are selected from the group consisting of quaternary ammonium salts, quaternary phosphonium salts, peracids, biguanides, iodophors, n-halamines and combinations thereof.

16. (previously presented) The fabric of claim 14, wherein the copolymer contains a metal salt.

17. (previously presented) The fabric of claim 23, characterized in that the grafted fabric has sufficient disinfectant activity to kill microorganisms selected from the group consisting of gram-negative bacteria, gram-positive bacteria, mold, fungi and viruses.

18. (previously presented) The fabric of claim 17, wherein the gram-positive bacteria are *Staphylococcus aureus*.

19. (previously presented) The fabric of claim 17, wherein the gram-negative bacteria are selected from the group consisting of *Escherichia coli* and *Pseudomonas aeruginosa*.

20. (withdrawn) The method of claim 6, wherein a disinfecting amount of the polymerizable monomer is grafted onto the fabric.

21. (previously presented) The fabric of claim 8, wherein the grafted fabric comprises sufficient peracid to detoxify pesticides.

22. (previously presented) The fabric of claim 8, wherein the grafted fabric comprises sufficient peracid to detoxify chemical and biological weapons.

23. (previously presented) An antimicrobial fabric produced in accordance with a method comprising the steps of:

treating a fabric with ozone to form peroxide groups on the fabric;

decomposing the peroxide groups with an iron catalyst to form oxygen radicals; and

grafting a polymerizable monomer to the oxygen radicals on the fabric surface, wherein the grafted fabric comprises a disinfectant that is the polymerizable monomer or a derivative of the polymerizable monomer.

24. (previously presented) The fabric of claim 23, wherein the grafted fabric is formed into garments.

25. (previously presented) The fabric of claim 24, wherein the garments are selected from the group consisting of masks, scrubs, lab coats, and caps.

26. (previously presented) The fabric of claim 23, wherein the grafted fabric is formed into items selected from the group consisting of surgical drapes, bed sheets, bedding, privacy drapes, towelettes, hygiene wipes, dressings and bandages.

27. (cancelled).

28. (previously presented) The fabric of claim 23, wherein the method is carried out without substantial disruption of interfiber adhesion of the fabric.

29. (previously presented) The fabric of claim 23, wherein the method is carried out without substantial loss of fabric strength by the fabric.

30. (previously presented) The fabric of claim 23, wherein the method is carried out without substantial loss of tensile strength, tear resistance and abrasion resistance by the fabric.

31. (Withdrawn) The method of claim 6, wherein the treating step is carried out at a temperature between about 40 and 80°C.

32. (Withdrawn) The method of claim 6, wherein the step of treating the fabric with ozone is carried out for between 10 minutes and 4 hours.

33. (Withdrawn) The method of claim 6, wherein the polymerizable monomer is supplied at a concentration of between 1 and 50 percent by weight.

34. (previously presented) A protective fabric for protection against chemicals produced in accordance with a method comprising the steps of:

treating a fabric with ozone to form peroxide groups on the fabric;

decomposing the peroxide groups with an iron catalyst to form oxygen radicals;

grafting a carboxylic acid to the oxygen radicals on the fabric surface; and

oxidizing the carboxylic acid to a regenerable percarboxylic acid, wherein the percarboxylic acid is covalently bonded to the fabric to provide the protection against chemicals.

35. (previously presented) The protective fabric of claim 34, wherein the step of oxidizing the carboxylic acid to the regenerable percarboxylic acid comprises reacting the carboxylic acid with a mineral acid and hydrogen peroxide to form the regenerable percarboxylic acid on the fabric surface.

36. (previously presented) The protective fabric of claim 34, wherein the carboxylic acid is acrylic acid.

37. (previously presented) The protective fabric of claim 34, wherein the percarboxylic acid covalently bonded to the fabric is regenerable by the method further comprising

regenerating the percarboxylic acid after use by exposing the fabric to mineral acid and hydrogen peroxide.

38. (previously presented) The protective fabric of claim 34, wherein the fabric comprises sufficient grafted percarboxylic acid to detoxify pesticides.

39. (previously presented) The protective fabric of claim 34, wherein the fabric comprises sufficient grafted polymerizable monomer to detoxify chemical and biological weapons.

40. (previously presented) The protective fabric of claim 34, wherein the fabric is selected from the group consisting of cotton, linen, gauze, polyester, nylon, acrylic and blends thereof.

41. (previously presented) The protective fabric of claim 34, wherein the fabric is formed into garments.

42. (previously presented) The protective fabric of claim 41, wherein the garments are selected from the group consisting of masks, scrubs, lab coats, and caps.

43. (previously presented) The protective fabric of claim 40, wherein the fabric is formed into items selected from the group consisting of surgical drapes, bed sheets, bedding, privacy drapes, towelettes, hygiene wipes, dressings and bandages.

44. (previously presented) The protective fabric of claim 40, wherein the fabric is characterized as having disinfectant properties.

45. (previously presented) The protective fabric of claim 34, wherein the method is carried out without substantial disruption of interfiber adhesion of the fabric.

46. (previously presented) The protective fabric of claim 34, wherein the method is carried out without substantial loss of fabric strength by the fabric.

47. (previously presented) The protective fabric of claim 34, wherein the method is carried out without substantial loss of tensile strength, tear resistance and abrasion resistance by the fabric.

48. (previously presented) The protective fabric of claim 34, further characterized in that the fabric provides protection against microorganisms.

49. (previously presented) The protective fabric of claim 48, wherein the microorganisms are used in biological weapons.

49. (previously presented) The protective fabric of claim 48, wherein the fabric has sufficient percarboxylic acid grafted to the fabric to kill microorganisms selected from the group consisting of gram- negative bacteria, gram-positive bacteria, mold, fungi and viruses.

50. (previously presented) The protective fabric of claim 49, wherein the gram-positive bacteria are *Staphylococcus aureus*.

51. (previously presented) The protective fabric of claim 49, wherein the gram-negative bacteria are selected from the group consisting of *Escherichia coli* and *Pseudomonas aeruginosa*.

52. (previously presented) The protective fabric of claim 49, wherein the fabric is formed into hygiene wipes.

53. (previously presented) The protective fabric of claim 49, wherein the fabric is formed into products useful for household disinfection.